

CLAIMS

What is claimed is:

1. An apparatus for measuring strain, comprising:
a semiconductor film and an adjacent metal shunt forming an interface
therebetween;
wherein a strain induced at least at the interface changes a resistance at the
interface.
2. The apparatus of claim 1, wherein:
the induced strain comprises a tensile strain.
3. The apparatus of claim 1, wherein:
the induced strain comprises a compressive strain.
4. The apparatus of claim 1, wherein:
the interface comprises a resistive interface.
5. The apparatus of claim 1, wherein:
the interface comprises a Schottky interface.
6. The apparatus of claim 1, wherein:
the semiconductor film comprises an n-type thin film with a thickness of
approximately one to ten microns.

7. The apparatus of claim 1, wherein:
the semiconductor film comprises Indium Antimonide.
8. The apparatus of claim 1, wherein:
the metal shunt comprises gold.
9. The apparatus of claim 1, further comprising:
a flexible membrane on which the semiconductor film and metal shunt are carried.
10. The apparatus of claim 9, further comprising:
a frame to which the flexible membrane is attached.
11. The apparatus of claim 1, further comprising:
a semi-insulating substrate on which the semiconductor film and metal shunt are
grown.
12. The apparatus of claim 1, wherein:
the semiconductor film and metal shunt are provided in a plate structure having a
substantially rectangular geometry and characterized by a filling factor of approximately
9/16.
13. The apparatus of claim 1, further comprising:
a control for obtaining a measurement indicative of the change in the resistance of
the interface by applying a constant current to the semiconductor film and the metal shunt
to induce a voltage therein, and measuring a change in the voltage that is indicative of the
change in the resistance.

14. The apparatus of claim 13, wherein:
the control determines at least one of a pressure and temperature based on the
obtained measurement.
15. The apparatus of claim 14, further comprising:
a memory for storing calibration data;
wherein the control accesses the calibration data for use in determining the at least
one of a pressure and temperature.
16. The apparatus of claim 1, wherein:
the strain is induced in a direction substantially parallel to a length of the interface.
17. The apparatus of claim 1, wherein:
heights of the semiconductor film and metal shunt are substantially equal.
18. A method for measuring strain, comprising:
applying a constant current to a hybrid semiconductor device comprising a
semiconductor film and an adjacent metal shunt forming an interface therebetween to
induce a voltage in the hybrid semiconductor device;
inducing a strain at least at the interface to change a resistance at the interface; and
measuring a change in the voltage that is indicative of the change in the resistance.
19. A method for fabricating a semiconductor device, comprising:
growing a thin semiconductor film on a semi-insulating substrate;
defining a semiconductor mesa with a desired lateral dimension by removing a
portion of the thin semiconductor film; and

depositing metal onto the substrate to form a metal shunt adjacent to the semiconductor mesa with a desired lateral dimension.

20. The method of claim 19, further comprising:

inducing a strain at least at an interface between the semiconductor mesa and the metal shunt to change a resistance at the interface.

21. A method for determining at least one of a pressure and temperature acting on a sensor, comprising:

exposing a sensor comprising a metal-semiconductor hybrid device carried on a flexible membrane to an environment in which the at least one of a pressure and a temperature acts;

obtaining a measurement indicative of a change in a resistance of the metal-semiconductor hybrid device caused by a deformation of the metal-semiconductor hybrid device that is induced by a corresponding deformation of the flexible membrane; and

determining the at least one of a pressure and temperature based on the obtained measurement.

22. The method of claim 21, further comprising:

accessing calibration data for use in the determination of the at least one of a pressure and temperature.